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AUTHOR Schwartz, Helen J.
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ABSTRACT

Computers are necessary to the future of literacy in the United States, but they are not determinative. Instead the determining factor will be human values and political will, and so it is necessary to build the future on democratic ideology. Four premises underlie plans for a feasible and desirable future: (1) education must serve an increasingly diverse student population; (2) a new pedagogy is needed with authentic tasks that involve the teacher as learner and the student as doer; (3) the "New Majority" needs to increase coherence and intellectual engagement in urban, commuter settings; and (4) the "New Literacy" requires new coalitions and partnerships. At Indiana University-Purdue University at Indianapolis, a project which lends computers to students to take home extends the class beyond the classroom by including faculty, administrators, students, and computing services personnel, as well as experts from other universities, in the resulting discussions. To effect future goals it is practical and reasonable to ask for help from the government, vendors, the students, and the community. (Two notes are included; 23 references are attached.) (PRA)

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Helen J. Schwartz
Professor of English
Indiana University-Purdue University
at Indianapolis (IUPUI)
425 University Blvd.
Indianapolis, IN 46202
IBGL100@INDYCMS

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Helen J. Schwartz
Professor of English
Indiana University-Purdue University
at Indianapolis (IUPUI)
425 University Blvd.
Indianapolis, IN 46202
IBGL100@INDYCMS

Pricing Literacy: The Ethics of Access

The term "pricing literacy" is ambiguous, meaning both finding the worth of literacy as well as its cost. In this preliminary exploration, I should warn you, there will be no bottom line answer, unlike Adams' The Hitchhiker's Guide to the Galaxy in which we find that the meaning of the life, the universe and everything is 42. In that novel, you may recall, it took a computer a number of years to come up with the answer, but then it engaged in the much longer process of finding an explanation for that answer. Today we will proceed in the reverse order, exploring questions and options before answers: How do we define literacy? Why is it valuable? What options for the future of education does the computer supply? In what directions do our values, history and demography point us in paying for literacy?

The term "literacy" originally meant the simple ability to read and write, but increasingly the definition is broadening to include the shared intellectual canon of Hirsch's "cultural literacy" as well as the ability to read and write critically. Theorists have increasingly seen culture, including educational goals and structures, embedded in ideological issues, and so it is no wonder that a number of forces have been combining to redefine literacy. Post-modernism posits an indeterminate reality, with a knowable Truth replaced by the socially constructed search for viable paradigms. Scientists talk about the tao of physics--explaining in mystical terms the effect of the viewer on the viewed. Literary critics and reading theorists show how the reader completes the interpretation of texts. Writers construct meaning with greater awareness of the reader's role, sometimes including multiple endings (as in The French Lieutenant's Woman) and exploring the possibilities of hypertext fictions or poetry that give the reader non-linear options for exploration (for example, James Dickey's poem read at the 1989 MLA Convention or Stuart Moulthrop's hypertext adaptation of Borges' "Garden of the Forking Paths"). If the Truth cannot be transmitted, the process of thinking becomes more important than memorization.

Literary critics such as Robert Scholes (in Textual Power) use the term "literacy" to conceptualize reading and writing together. The privileging of "literature" and "creative" writing over "profane" reading and writing sets up divisions between novice and expert, producer and consumer of text. Combining beginning reading and writing, freshman comp, Shakespeare's King Lear and Coleridge's Biographia Literaria in one conceptual bin allows us to pay attention to process and the construction of meaning in ways unknown with ghettoization in schools of education and departments of literature and English Composition Boards.

Educators, employers and politicians deplore the state of literacy in the United States, from A Nation at Risk to yesterday's paper. It does no good to argue that literacy is only perceived as worse now because we attempt to educate a broader spectrum of our populace.[1] Education has always responded to the needs of the society for which it does its work. It is a commonplace now that modern American education evolved to meet the needs of an industrial society, teaching regularity (by marking "tardiness" and "attendance" and "citizenship" as well as math and social

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[1]For example, see Sledd (495-498) and Connors and Lunsford (406-407) who provide data for such an argument, though in the context of broader theses.

studies) and demanding memorization. In an Information Age, the emphasis on conformity and hierarchy are counter-productive when workers need judgment even in line jobs to function in a flatter organizational structure. The need for critical thinking replaces memorization. The need for collaboration replaces the isolation of the modular task.

The tool of the Information age is clearly the computer. It decreases reliance on memory and generates options. Communication is increasingly computer-mediated whether in writing, sending, receiving or storing. Any sophisticated calculation, analysis or indexing is computer-driven and machine-readable. Multi-media capabilities redefine text to mean alphanumeric characters, graphics (both still and moving), sound and kinesthetic movement. Text is anything that can be digitized (Schwartz et al. 157-160). As Lanham argues, computers are redefining literacy, and we ignore that expansion at peril of marginalization. And Ulmer foresees a new stage of human cognition: from orality to literacy to a new literacy that functions as a prosthesis to human intelligences, combining right- and left-brained activities. (See also McCorduck.)

Literacy, including computer literacy, is priceless because it will increasingly mediate personal expression and participation in American culture. To keep our political system democratic, to keep our economy competitive, we have no choice but to create a literate populace. The questions remain: what will that education look like? what will it cost? and who will pay for it?

The computer makes possible new ways of thinking and discovering. Selfe argues that each technology has its own "grammar" that structures but does not limit its possible uses. For example, "instant replay" becomes a mode of explanation that people use metaphorically but consciously in their discursive repertoire (along with comparison-and-contrast, and classification). And in storage and retrieval, the map is replaced with the book "index" (connecting place and page), which is replaced by the areas of Boolean circles in computer search, so that an item becomes locatable by its attributes. (See also Kaplan.) Yet, although computers are necessary to literacy, they are not determinative. I will argue that the future of teaching and learning in the Information Age depends primarily not on technology, but on human values and political will. To illustrate, let us examine the possible educational futures of three students: John Henry IV, John Faust XX, and Consuela Barraka.

John Henry's great-grandfather, a steel-driving man, fought an epic battle against the machine that threatened to replace him laying railroad tracks. Because John Henry won the contest, he represents the indomitable human spirit; because he lost the war, dying with his hammer in his hand, his progeny have served the machine in the industrial era of mass production. Will computers be necessary in the education of John Henry's great-grandson? Yes, because the most basic functions in our society will require a minimal computer literacy. But for John Henry IV, education will continue as in the past, emphasizing low-level cognitive skills involving drill and memorization. John isn't stupid, but he is poor. He is intellectually capable of computer use involving creativity and higher cognitive skills, such as writing with word processing, data base construction and retrieval or hypertext use. But such activities are computer-intensive, and the fiscal realities of school funding and lack of teacher training mandate the resource-stretching curriculum of interactive tutorials.[2] (See Balestri et al.) On the assumption it is easier to create an intelligent machine than a smart human being, the human-machine interface is "dumbed down." For example, cash registers use icons instead of numbers.

John Faust ranges the world at his computer terminal to find what his ancestor sought: "was die Welt im Innersten zusammen halt" (what holds the universe together in its innermost being). For his computer-intensive education, plenty of machines are available at school, and he has a high-end computer and modem at home. Education gains a new authenticity, as his access to

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[2]The imaginary examples given in the following paragraphs are not entirely hypothetical, but based on reports in the sources supplied parenthetically.

vast databases initiates him early to the world of affairs. Like the protagonist in Gibson's Neuromancer, John learns as a data jockey to experience the world through its databases: he makes original contributions to archaelogy as he studies classical texts and use computer graphics to draw layer after hypertextual layer of Messina or ancient Syracuse (Romano). He learns about learning as he programs an expert system, supplying data and procedural rules by which his program can act as a tourist guide (Sharples et al.). He can create reality and explore it: after using computer-aided design (CAD) to construct a model building, he can don his data helmet and data glove to enter that "virtual reality" and roam around in his own mental construct (Hayles). Exploring the past, directing the present, creating the future, John Faust XX is an individual whose learning is without limit.

Consuela Baraka attends a magnet school near her inner-city home. She likes to get to class early so that she can read the electronic mail waiting for her and get some extra time preparing for class. At the moment, Consuela and her classmates are transmitting data about acid rain that they have collected in the schoolyard. Joining with other schoolchildren in Norway, Australia, Great Britain and Canada, she is contributing to a database that will allow them to correlate acid rainfall and its relation via prevailing winds to sources of industrial pollution (Longworth). Later, she will correspond with a university student at the School of Education in the state's capital; perhaps Ilise will come to her school for her practice teaching (Halla). And in the afternoon, she will help edit the class' newsletter for desktop publishing (which she can take home) and for electronic transmission to their sister school in Berlin (Takayoshi). Like John Faust, Consuela reaches out to the world in authentic activity, but she works collaboratively to learn, to do and to communicate.

The futures pictured here currently exist (at least in embryonic form), so they are not only possible, but also compatible with each other. As Kaplan remarks, "Ideology is in fact always polyphonic, for the discursive practices shaping human institutions, actions, and beliefs--and the tools human beings develop and use--always present multiple and conflicting meanings and values." Economic need calls for a new kind of education for a changing world, widely available to the nation's future workforce. And democratic principles call for equal opportunity regardless of race, gender or economic status. However, the natural result of business as usual will be an increased tendency toward oligarchy or a mandarin class. As Ohmann has remarked,

> I see every reason to expect that the computer revolution, like other revolutions from the top down, will indeed expand the minds and the freedom of an elite, meanwhile facilitating the degradation of labor and the stratification of the workforce that have been the hallmarks of monopoly capitalism from its onset. (683)

Demographic trends suggest that we will not need all our workers. Despite the claim that computerization would create more jobs than it destroyed, that prediction has not so far come true. And the population is growing fastest in those segments with which American education has traditionally been least successful: Blacks and Hispanics. Over 50% of the K-12 population in Texas today is Hispanic. The emerging New Majority in post-secondary education includes increasing numbers of minorities, older urban commuter students, often part-time or heavily committed to work or home responsibilities unlike the traditional 18-25 year old residential student. Education-as-usual shortchanges the New Majority compared to residential students (Chickering). However, computers represent a medium that can open access and build community. (For example, an Annenberg/CPB initiative has recently identified seven projects to increase quality access to higher education through combined technologies.)

I have painted three futures, but expensive access to computing facilities is vital, with the price-tag growing the more equitable we make access to that resource. Having surveyed what is possible, and surveyed what our economic and political system says is desirable, let us consider now how to make the desirable feasible.

Four premises underlie our plans for the feasible and desirable future:

1. Education must serve an increasingly diverse student population.

2. A new pedagogy is needed with authentic tasks that involve the teacher as learner and the student as doer.

3. The New Majority need to increase coherence and intellectual engagement in urban, commuter settings.

4. The New Literacy requires new coalitions and partnerships.

There must be many possible visions based on these four premises, but I'd like to close with a description of an emerging reality we are creating at Indiana University-Purdue University at Indianapolis (IUPUI)--the Twenty-First Century Citizen Scholars. In modelling the future, we are including a diverse group of students, faculty and staff, regardless of socio-economic class. Using loaner computers for students to take home, we are extending the class beyond the classroom, bringing in the concerns and experiences of students and their communities, opening the door to expert or distant participants. Computer bulletin boards allow students to communicate with each other off-campus, at a time convenient to them. Children, siblings and spouses have contributed to our BBoards. Experts from Stanford, the University of Minnesota, and Purdue University have joined our discussions. Students have acted as mentoring pen-pals to teachers in a seminar on electronic communication at the University of Edinburgh. Students have shared sources and exchanged advice in their projects about deaf education, after-school and weekend literacy programs, and teacher training. The project includes faculty, administrators, students and computing services personnel. Presentations or articles have been presented or accepted, authored by this combination of Team21 players, at one international conference, six national conferences and four regional meetings. Computers have been contributed by IUPUI and by a Joint Development Grant from IBM. Project personnel have usually been recruited from students in project classes. And next semester a Research Group of faculty and students will work collaboratively to describe and evaluate our experience.

How can such a plan be institutionalized? Who pays for equity? We have no firm answers at this point, but our plans show where we think it is reasonable and feasible to ask for help:

Government support--available through university funding (seed money) and publicly-funded grants. Cooperation and sharing of facilities between universities and K-12 schools can increase neighborhood access for commuters. The state's considering monies for computer purchase as eligible for financial aid would also help.

Vendor support--grants for demonstration projects and rebates for volume purchases (by students and by the university). Lowered prices for increased volume will be essential, along with availability of powerfully-equipped but low-end machines.

Student support--purchase of home computers; university and school service to help "pay" for community and vendor support via loaners or special discounts.

Community support--private foundation grants and contributions from business to support university purchase of loaners or reduced-cost student purchases. In exchange, students will gain experience in community projects negotiated with donors.

I have argued that computers are necessary to the future of literacy in America, but they are not determinative. Instead the determining factor will be human values and political will. If John Henry is to have access to the opportunities of John Faust and Consuela Baraka, we must build the future on a democratic ideology. With the possibilities and desirabilities before us, we must form new coalitions and partnerships to make that virtual reality come true.

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